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ORIGINAL ARTICLE **OPEN ACCESS**

Impact of Socio Demographic Factors on the Prevalence of Iron Deficiency Anemia among Reproductive Age Women Attending Community Health Centre (CHC) in Rural Area

Swati Rai and Sunita Mishra*
Department of Human Development and Family Studies, School of Home Science, Babasaheb Bhimrao Ambedkar University, Lucknow, Uttar Pradesh, India- 226025
*Correspondence Author's Email id- foodnutritionsm27.bbau@gmail.com

ABSTRACT
Iron deficiency is the most common nutritional disorder in the world. It is a global public health problem affecting both developing and developed countries with major consequences for human health [WHO, 2008] as well as social and economic development. In 2002, iron deficiency anemia (IDA) was considered to be among the most important contributing factors to the global burden of anemia [WHO, 2002].The present cross-sectional study involving 200 women of reproductive age as the study population was carried out in the OPD of Obstetrics and Gynecology department, Community Health Centre, Shivgarh, Raebareily. The aim was to find out the prevalence of IDA and its association with socio-demographic factors of the respondents. The mean ± standard deviation (SD) of hemoglobin found to be 11.1 ± 2.1.The prevalence of anemia was found to be 66.5%, of which 14.5%, 43%, and 9% of women had mild, moderate, and severe anemia, respectively. Statistical analyses have shown that predisposing factors like age, education of respondents, and socioeconomic status were found to be significantly associated with anemia. Addressing determinants, there is a scope to improve anemia in this area.
Keywords: *iron deficiency anemia, prevalence, women of reproductive age, hemoglobin, socioeconomic status*

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INTRODUCTION

World Health Organization defines "Anemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiological needs, which vary by age, sex, attitude, smoking and pregnancy status"[1].Anemia is a major public health problem worldwide. Around 2 billion people, 30% of the world's population, are affected by anemia,[2] and the majority of them are from the developing world.Most of the burden occurs in the low-resource countries of South Asia and Africa largely because of a combination of poverty, poor dietary intake, and a high burden of disease [3,4]. It is reported that 56% of pregnant women in developing countries and 18% in developed countries are anemic [5].For non-pregnant women, the estimated prevalence is 43% and 12% in developing and developed countries, respectively [5].The causes of anemia are manifold, but iron deficiency is by far the most important cause of nutritional anemia worldwide [6].Other conditions including folate, Vitamin A, and vitamin B12 deficiencies, intestinal parasites especially hookworm infestations, chronic inflammation, malaria, and poor bioavailability of dietary iron can also cause anemia[7].

Iron is an essentialelement for blood production in human beings. About 70 percent of the body's iron found in the red blood cells of blood called hemoglobin. Hemoglobin is essential for transferring oxygen in the blood from the lungs to the tissues. Higher hemoglobin (Hb) levels are associated with improved performance and quality of life (QOL) [8].A high demand for iron is required during menstrual blood loss, pregnancy, and lactation.Iron deficiency results from inadequate nutrient intake, excessive loss of iron from the body due to heavy and regular blood loss during menstruation, the birth of children at a close interval of time, and multiple abortions.

A recently published study on the burden of disease in India concluded that the burden of IDA is 3.0 times higher than the average globally for other geographies at a similar level of development and that women are disproportionately affected[9]. In India, Iron deficiency anemia affects an estimated 50 % of the population. It is a major risk factor for poor pregnancy outcomes and is responsible for about 20% of all

maternal death in India. Iron deficiency anemia results in an increased risk of premature delivery and low birth weight. Iron deficiency in late pregnancy also results in poor iron stores in the fetus[10].
In India, the prevalence of anemia and its associated factors among reproductive age group women have largely been overlooked. Incorporating these findings would help us in having an in-depth understanding of the effect of disease on various dimensions of health. With these vacuities in literature, this study was conducted to find the prevalence of IDA and its associated factors among reproductive-age women in a rural area of Raebareily District, Uttar Pradesh, India.

MATERIAL AND METHODS

Subjects

A hospital-based cross-sectional study executed in Community Health Center (CHC), Shivgarh, Raebareily, Uttar Pradesh. Through simple random sampling, a total of 200 women of reproductive age group (15-49 years)were recruited who attended the OPD of obstetrics and gynecology department of CHC.The study was carried out from March 2018to May 2018. Those females who denied for blood test (hemoglobin estimation) and had severe health issues were excluded from the study. After explaining the purpose of the investigation, informed consent was obtained from all the participants. The confidentiality of their personal details and study results was ensured. Ethical clearance was obtained from institutional ethical committee before conducting the study.

Data Collection

A structured interviewer-administered open-ended questionnaire was developed. The questionnaire was based on prior literature. All questions were designed, pilot tested, modified, and resettled to obtain and record information easily. Several major domains were covered in the questionnaire regarding socio-demographic data(age, marital status, education level, employment status, type of family, and socio-economic class).

Data Analysis

The data was analyzed using Statistical Package for the Social Sciences software for Windows (SPSS Inc., Chicago, Illinois, USA) version 21. Percentages and frequencies were applied for descriptive analysis. A Chi-square test was done for testing the association between anemia and its potential predictors. The value of $P < 0.05$ was considered statistically significant.Subject confidentiality was maintained during and after information collection.

Determining Hemoglobin Status

To know the prevalence of IDA and to differentiate between anemic and non-anemic study subjects it was indispensable to acquaint with the hemoglobin level of each participant. A free flowing drop of blood was obtained from each subject by the finger prick method using a sterile disposable lancet. The hemoglobin level was assessed by using the True Hb hemoglobin meter. Hemoglobinmeter is a simple, reliable, valid and inexpensive tool used for screening of anemia among women and children where resources are limited especially in rural areas. The severity of anemia graded as per WHO criteria. Levels of hemoglobin in different categories defined as follows: for non-pregnant women: normal - ≥12.0 g/dl; mild - 10.0 to 11.9 g/dl; moderate - 7.0 to 9.9 g/dl; and severe - <7.0 g/dl. For pregnant women, the values are as follows: normal - ≥11.0 g/dl; mild - 10.0 to 10.9 g/dl; moderate - 7.0 to 9.9 g/dl; and severe - <7.0 g/dl. Any anemia is defined as the concentration of hemoglobin level<12.0 g/dl for non-pregnant women and <11.0 g/dl for pregnant women.

RESULTS

A total of 200 subjects enrolled in the study. According to the WHO classification, the prevalence of IDA among study participants was 133 (66.5%) and 67 (33.5%) women had a normal hemoglobin level. Mean ± standard deviation (SD) of hemoglobin found to be 11.1 ± 2.1.Their different levels of severity of anemia were as follows: 14.5% with mild anemia, 43% with moderate, and 9% with severe anemia.(Table 1)
The socio-demographic characteristics of the subject show that the maximum no. of subjects were from the age group 20-29 years (62.0%) followed by 30-39 years (17.5%). The majority of the participants (77.0%) were from joint family setup. With respect to education, only 13% had studied up to graduation whereas 25.5% were illiterate. Most of the women (94%) were non-working.85.5% of the participants were married. According to modified B.G. Prasad's classification [11], most of the women belonged to Class 2 (upper-middle class), Class 3 (middle class) and Class 4 (lower middle class) (Table 2)
Thehighest prevalence of IDA was reported in the age group of 40-49 years (92.3%) and 30-39 years (80%) while lowest prevalence was found in the age group of 20-29 years (59.6%) with the significant association ($p<0.05$). Significant association was also found between socio-demographic variables and anemic status of the reproductive age group women in terms of literacy status, marital status, and socio-economic status with p-value <0.05. However, association in terms of family setup and employment

status was found to be non-significant. Education attainment plays a significant role in the prevalence of anemia, i.e. illiterate women (88.2%) suffer more from IDA in comparison to those who have studied up to primary, secondary, or higher degrees.(Table 3).

Table 1. Distribution of respondents according to grading of IDA

Hemoglobin status	n (%)
Normal	67 (33.5)
Anemia	133 (66.5)
Mild	29 (14.5)
Moderate	86 (43.0)
Severe	18 (9.0)

Table 2. Distribution of respondents according to the socio-demographic profile

Variables	Frequency (n=200)	Percentage
Age (in years)		
15-19	28	14.0
20-29	124	62.0
30-39	35	17.5
40-49	13	06.5
Family setup		
Nuclear	46	23.0
Joint or extended	154	77.0
Literacy status		
Illiterate	51	25.5
Primary	56	28.0
Secondary	34	07.0
Higher secondary	29	14.5
Graduate	26	13.0
Others	04	02.0
Employment status		
Working	12	06.0
Non-working	188	94.0
Marital status		
Single	29	14.5
Married	171	85.5
Socio-economic status		
Class 1	04	02.0
Class 2	57	28.5
Class 3	56	28.0
Class 4	57	28.5
Class 5	26	13.0

DISCUSSION

The objective of the present study was to determine the prevalence of IDA among reproductive-age women. Secondly, to find out the association of socio-demographic factors and gynecological status with IDA. Despite the major efforts taken to combat IDA, the prevalence of IDA in the present study was found to be more than fifty percent (66.5%). This is comparable to study done in Ranchi by Kumar V et al. in which 66.4% of rural women were anemic [12]. As per the National Family Health Survey-4 (NFHS-4) in a rural area of Raebareily, Uttar Pradesh, the prevalence of anemia among non-pregnant women and pregnant women was 46.5% and 51% respectively. All women age 15-49 years who are anemic contribute 46.6% of the total rural population, which is lower to the present study [13].The Maximum number of anemic cases (43%) in the present study had moderate anemia. The prevalence of severe anemia (9%) was the least. These findings are similar to the findings of Sharadamani G.S. who also observed the prevalence of moderate anemia to be maximum (57.2%) followed by mild (30.9%) and severe anemia (11.8%) [14]. Similar findings were also reported by [15, 16].

Our study findings show that the participants in the age group of 30-49 years were relatively more affected than other age groups. Similar findings were reported by [17, 18, 19].An American study discovered that the rates on both anemia and moderate-severe anemia increased bi-modally, with peaks seen in the 40–49 and 80–85 age groups [20]. A study in China and Iran also reported high prevalence of

IDA among 40-49 years age of women [21, 22].On contrary, other studies shows that women in the early phase of reproductive age (<30 years) were most affected[14, 16].This variation might be due to the difference in location and nutritional factors among reproductive age group women.

In the present study, anon-significant association was observed between family setup and IDA whereas Rajput *et al*. reported that a significantly higher proportion of anemic women belonged to a joint family [16].

Regarding employment status in the present study, the majority of them were involved in household work (94%) followed by remunerative work(6%). This stresses the fact that the predominant reproductive age group females were involved in house making and not employed in any income generating work. Conversely, no significant association was observed between the prevalence of IDA and working status whereas a study done by Rahman KM. et al. reported a significant association [23].

In our study, a significant association was observed between low educational and socioeconomic status of women and prevalence of iron deficiency anemia during reproductive age. Iron deficiency anemia was more common among those who were illiterate or educated only up to primary level. Association between anemic status and socioeconomic strata also showed a similar trend with decreasing prevalence of iron deficiency anemia with improvement in socioeconomic status. Similar findings were reported by Rajput S. et al,Panigrahi A. et al. and Rahman KM. et al [16, 18, 23].In our study, 96% of women in lower socioeconomic strata had iron deficiency anemia as compared to 50% women in upper socioeconomic strata. This finding validates that women in lower socioeconomic strata have limited access to a nutritious diet and they generally keep on a normal diet even during pregnancy and lactation. IDA status and socioeconomic strata showed a similar trend with decreasing prevalence of iron deficiency anemia with improvement in socioeconomic status. However, Kumar V. *et al* found that there was no significant association between IDA and socioeconomic status along with literacy status [12, 19].

Table 3. Association of IDA with socio-demographic variables

Variables		Anemic Anemic (n=133)	Anemia categorization (n=133)			Not Anemic (n=67)	Chi-square value p-value
			Mild (n= 29)	Moderate (n=86)	Severe (n=18)		
Age (in years)	15-19 (n=28)	19(67.8)	02(7.2)	13(46.4)	04(14.2)	09(32.2)	19.28 0.023
	20-29 (n=124)	74(59.6)	19(15.3)	48(38.7)	07(5.6)	50(40.4)	
	30-39 (n=35)	28(80.0)	07(20.0)	18(51.4)	03(8.6)	07(20.0)	
	40-49 (n=13)	12(92.3)	01(7.7)	07(53.8)	04(30.8)	01(7.7)	
Family setup	Nuclear(n=46)	31(67.3)	06(13.0)	23(50.0)	02(4.3)	15(32.7)	2.219 0.528
	Joint / Extended (n=154)	102(66.3)	23(15.0)	63(41.0)	16(10.3)	52(33.7)	
Literacy status	Illiterate(n=51)	45(88.2)	14(27.4)	29(56.8)	02(4.0)	06(11.8)	39.88 0.000
	Primary(n=56)	34(60.7)	09(16.1)	17(30.3)	08(14.3)	22(39.3)	
	Secondary(n=34)	19(55.9)	02(5.9)	11(32.4)	06(17.6)	15(44.1)	
	Higher secondary(n=29)	20(69.0)	01(3.4)	18(62.0)	01(3.4)	09(31.0)	
	Graduate(n=26)	12(46.1)	02(7.6)	09(34.6)	01(3.9)	14(53.9)	
	Others(n=4)	02(50.0)	01(25.0)	01(25.0)	00(00)	02(50.0)	
Employment status	Working(n=12)	07(58.3)	01(8.3)	05(41.7)	01(8.3)	05(41.7)	.601 0.896
	Non-working (n=188)	126(67.0)	28(14.9)	81(43.1)	17(9.0)	62(33.0)	
Marital status	Single(n=29)	22(75.8)	02(6.8)	13(44.9)	07(24.1)	07(24.2)	16.51 0.011
	Married(171)	111(64.9)	27(15.7)	73(42.7)	11(6.5)	60(35.1)	
Socio-economic status	Class 1(n=4)	02(50.0)	01(25.0)	01(25.0)	00(00)	02(50.0)	28.38 0.005
	Class 2(n=57)	35(61.5)	04(7.01)	23(40.3)	08(14.0)	22(38.5)	
	Class 3(n=56)	30(53.5)	09(16.0)	15(26.7)	06(10.8)	25(44.5)	
	Class 4(n=57)	40(70.2)	07(12.3)	30(52.6)	03(5.3)	17(29.8)	
	Class 5(n=26)	25(96.0)	08(30.7)	16(61.5)	01(3.8)	01(4.0)	

CONCLUSION

The present study revealed that a very high prevalence of IDA among reproductive-age women (66.5%) is an alarming sign and indicator of socioeconomic status and illiteracy. Women who were under peak childbearing age, as well as low-income groups, have more chances to experience IDA because there is a definite role of nutritional deprivation in the development of anemia and lack of balanced diet especially

deficient in iron and folic acid. It is seen that the educational level of women and the standard of living of households play a considerable role in determining the degree of anemia in women. Efforts must be taken to enhance the level of education and the economic status of all women. Addressing determinants, there is a scope to improve anemia in this area.

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CONFLICT OF INTEREST

Nil

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